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AMERICAN BASEBALLS AND GERMAN BOATS

By Dr. Edwin E. Slosson

Mark Twain counts as one of the great events in human history the moment when the idea shot through the brain of Howe "that for a hundred and twenty generations theeye had been bored through the wrong end of the needle".

Maybe some future author will count that moment equally momentous when the idea shot through the brain of Flettner that the smokestacks of an ocean vessel should hot be used to carry off the smoke of the engine for if they were revolved no engine would be needdd. His experimental vessel, the "Buckau", looks like an ordinary steamboat with two extrordinarily tall funnels. These are simply smooth cylinders, made of thin sheet steel, ten feet in diameter and sixty feet high. But no sooty,steamy cloud comes out of the top and if you looked down into one of them you would not be choked with sulphurous fumes, and you would see no fiery flares at the bottom. All you would see would be a ten horse-power electric motor, which rotates the cylinder, yet the vessel is propelled with the force of a thousand horse-power engine. She has neither propellersnor paddle-wheels, neither furnace nor fuel, neither yards nor sails. Her only engine is the little Diesel for runnir the two electric motors inside the cylinders, and all that this needs is a little crude petroleum or tar-oil for its internal combustion.

The propulsive power of the ship is borrowed from the wind and she gets the best of it when the wind is not going her way, but blows abeam instead of aster She can make headway against the wind only by tacking like a sailboat.

Since the "Buckau" has no boilers she needs not bunkers, since she carries no coal she needs no stokers, and since she hoists no sails she needs no sailors. Even the helmsman can be dispensed with for no rudder is necessary. The ship can be steered by changing the rate and direction of the rotation of the cylinders, and this the captain might control by pressing buttons on the bridge. Reversing the rotors backs the boat. Ruming one rotor around one way and the other the opposite way turns the boat about as on a pivot. It would seem that such a ship would require no bigger crew than a bicycle. Anyhow the elimination of the boilers and the bunkers and the quarters of the crew should leave a lot of room for cargo and passengers.

The question of how the queer craft would behave in a heavy sea was settled on January 6 when the "Buckau" steamed out of harbor, no, I should say sailed out, no] I should say, rotored out, and made nine knots an hour in spite of, and with the aid, of, a twenty-knot wind.

We should have expected the rotor ship to have been an American invention for two reasons; first, because the principle involved is the same as our pitchers employ in putting the curve on a baseball in the national game; and, second, because this force has been thoroughly studied in American laboratories of aerodynamics. A recent technical paper by Elliot G. Reid of the Langley Memorial Aeornautical Laboratory is devoted to "tests on rotating cylinders" and gives the formulas by which the force can be calculated and photographs showing how air currents behave in passing around a cylinder. If the cylinder is stationary, the wind divides and goes by equally on both sides, producing no effect except a push on the windward side. But if the cylinder is revolving the wind receives different treatment on the two sides. On the side of the cylinder where the rotary motion is in the same directionas the wind, the air is helped along and speeded up by the friction of the surface of the cylinder. Consequently, the air pressure is reduced on this side and a sort of suction is formed. On the side of the cylinder that is turning against the wind, the opposite effect is produced by the friction. That is, the flow of the air current is impeded, the air is compressed and its pressure on the cylinder is increased. The net result of diminishing the pressure on one side and increasing it on the other is to produce a push acting on the cylinder at right angles to the wind, andit is this force that propels the Flettner boat.

The power of this cross-wind force depends upon the velocity of thewind, and hight, and diameter of the cylinder and its speed of rotation. The greater these are the stronger is the power developed. The Langley Laboratory finds that this force appears suddenly when the speed of the surface of the rotating cylinder rises to half that of the wind, and that thereafter the force increases steadily with the speed until the surface is moving twice as fast as the wind or faster. The experiments suggest that if the rotating shaft is made in the shape of a Greek cross instead of a smooth cylinder a greater cross wind force may be produced though it requres more power fofrotation. The National Advisory Committee for Aeronautics has been engaged for a year in the investigation of the possibility of equipping airplanes with rotating cylinders so as to utilize this cross force to impart a lift to the machine instead of depending wholly on the angle of the winds.

But neither our baseball fans nor our aviation experts have applied the principle to ship propulsion. So Anton Flettner has a free field and if his invent works as well as the German papers claim, he may appear before long in one of our ports with the ten-thousand ton sailless ship that he plans to construct for trans-Atlantic trade. It will be as strange an apparition as the submarine that bobbed up at Baltimore loaded with German dyes and drugs during the war, and it will be much more welcome.

ROWING ATHLETE SHOWS HALF STRENGTH OF HORSE

"Strong as a horse", spoken admiringly of a mightly athlete, is not so great an exaggeration as it sounds. Exact studies of the physical exertion put forth by the members of the famous Yale crew of 1924 by Drs. Yandell Henderson and Howard W. Haggard of the department of applied physiology at Yale, show that each man developed, during the period of a race, about one-half horsepower.

Determinations of energy expended were obtained in various ways. The men were exercised individually on rowing-machines with power meters attached; the ratio of oxygen taken in to carbon dioxid given off in breating was determined; the racing shell they used was towed by a power boat with a spring balance set into the towline.

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"The data from these three methods were in general in fair agreement," say Dr. Henderson. "They indicate that the maximal power exerted is from .45 to .55 horse power per man, or expressed in the heat equivalents, 4.8 to 5.9 calories per minute, with a total energy expenditure of 19 to 29 calories per minute, or 13 to 20 times the basal rate."

It was noted that these athletes did notpuff and blow noticeably, however, great their exertion,; this is in marked contrast with the distress of untrained or half-trained men. The amount of oxygen they took in through their lungs reached about the limit of the carrying power of heart and blood; yet it was not sufficient to replace the amount burned up during the race. As Dr. Henderson expresses it, "He draws heavily on his credit and incurs oxygen deficits; these deficits are repaid by the high rate of oxygen absorption for a time after the work is ended."

CROSSWORD PUZZLE MAKERS OVERLOOKED THIS ONE

"Word of two letters, both vowels; meaning a type of lava; probably originated in native Hawaiian language." Why this word has not yet joined the other two-vowel aids to crossword puzzle making is itself a puzzle. The family awaits it; "Ai", that indispensable two-toed sloth; "Io", rosy goddess of the ancients, "eo" and "ea", immigrant Latins. The word isn't in the dictionaries yet. It is "Aa". That's all. "Aa".

ENGLISH GROWING SIMPLER BY LOSING PLURAL NOUNS

English, said to be the easiet language to learn, may soon by simplified still further by the elimination of plural nouns, is the claim of Prof. O. F. Emerson of Western Reserve University. "Our language has tended to the increased use of the singular number ever since Indo-European times," he states. Prof. Emerson cited a collection of 335 proverbs of Queen Elizabeth's time recently reprinted. "Of these, 25 were stated in the plural form, 38 contained both singular and plural and the remainder, or 272, used only the singular number," he said. This shows that the tendency was well defined at the time of the Renaissance. A popular illustration of the idea is the question "Who is there?" in answer to a knock at the door, rather than the query, "Who are there?"

"This tendency towards the elimination of plural forms has accompanied the growth of the language," Dr. Emerson explained. "The one common exception, the use of the pronoun 'you' no matter howmany persons are referred to, is a social custom, rather than a violation of the rule."

Much valuable information about the culture of the Pueblo Indians has been lost because many of the graves were rifled by prehistoric grave robbers.

Over forty per cent of the mahogany shipped into the United States comes fr Cental America.

USEFUL PIGMET NOW MADE ELECTRICALLY

Electrical means for manufacturing carbon black, a widely used pigment, have been devised by the Bureau of Mines, U. S. Department of the Interior. Carbon black consists of exceedingly finely divided particles of carbon, and is at present produced by burning natural gas with an insufficient air supply, and permitting the flame to impinge on a cool metal surface. This method has been found strongly objectionable in many communities, and stringent ordinances have been passed to regulate its manufacture.

Inasmuch as carbon black is in great demand in the manufacture of printer' ink, shoe and stove blackings, phonographs records, black leather, typewriter ribbons, carbon paper, and many other articles, a method for manufacture that does away with the objectionable though inevitable dirtiness of the present process has been much desired. The Bureau of Mines process involves the use of high voltage d charges from electric arcs acting upon cheap light-oil distillates.

ARABIAN INSECT PERFECT FEMINIST

Utter carelessness in the care of her children because she can always tel where they are is the chief characteristic of an Arabian water beetle described i a lecture by Major R. E. Chesseman. Catching her husband unawares this militant female plants her eggs securely in the middle of his flat back where he cannot knock them off. Then she goes on about her business. When the eggs hatch the young grow heavier and heavier until the poor husband beetle can hardly crawl alon The one observed by Major Cheeseman was a living baby carriage as he had no less than ninety babies firmly attached to his back.

ASTRONOMICAL BOUNDARIES LEGAL, SAYS SURVEY BOARD

That boundaries determined by the imaginary lines of latitude and longitu are quite valid, the opinion was expressed at a meeting of the U. S. Board of Surveys and Maps. A member raised the question whether the courts would recognize these astronomical lines as legal, on the same basis with the true geographic positions that come through careful adjustments by triangulation. A. D. Kidder, who occupie the chair, stated that from his own experience he had found that the courts are hardly able to distinguish between positions as determined by the two methods.

Mr. Kidder called attention to the fact that a great many of the boundari of the western states were defined as certain parallels of latitude or meridians of longitude, and that the effect of that definition was to cause the survey of those boundaries according to the best information available at the time; but that after a line had been surveyed and monumented and the survey approved, the line itself became the controlling boundary rather than the astronomical line originall named.

Because the demand for crimson clover seed precedes the arrival of the ne crop seed by several weeks, the early offerings are all from seed held over from the previous year.

CAVITIES IN TEETH DUE TO SPECIAL GERM

A special germ, deficient diet, and predisposing conditions in the mouth, combine to foster decay of teeth, according to discoveries by Drs. J. E. Rodriguez and R. A. Kelser, of the U. S. Army Medical School. Dr. Rodriguez has found that an individual germ of the lactic acid family is the one responsible for the piercing of the hard enamel of the teeth and exposing the soft dentine inside to many different types of bacteria. It thrives in an acid medium, and itself produces an acid condition.

The germs are now being used on rats in order to see whether it is not possible to produce diseased teeth artificially in the living animal, since experiments on isolated teeth have been successful. "I hope that within five or six months, we will be able to duplicate in rats the changes which take place in the teeth of human beings," Capt. Rodriguez states.

These investigations do not prove that the mere presence of the causal organism is the only requirement for the appearance of dental decay, it is pointed out. Conditions of diet must prevail which foster the growth of the germs, and further, it must be easy for them to lodge in the mouth so that the etching process can go on. "I believe that the two factors are of equal importance," Capt. Rodriguez says. "The environment in the mouth must be favorable to the organisms."

This is why three sets of rats are being usedin the experiments designed to produce artificial decay. One group gets a perfect diet; a second group receives an unusually high persentage of sugar, and a third set receives food which is deficient in calcium and in fat-soluble vitamin A. Dr. Rodriguez then watches how the teeth of the rats develop, and follows the changes which result when the mouths of the rodents are infected with the lactic organisms. The high-sugar diet is used to provide the offending organisms with plenty of material for the manufacture of acid, and the deficient rations are employed to study the function of calcium salts and the fat-soluble vitamin in the formation of teeth, as some investigators claim that sound teeth cannot develop unless there are adequate supplies of each of these two substances.

GERMS FURNISH GROWTH PROMOTERS FOR PLANTS

Substances working on plants much as vitamins A and B do on animals have been studied by Dr. Florence A. Mockeridge of University College. The materials she found stimulating the growth of plants were associated with certain soil bacteria.

In her experiments Dr. Mockeridge used small, green water plants called duckweeds. One lot of duckweeds were put into dishes or water containing merely all the needed minerals. A second lot were put into similar dishes with a small amount of a killed culture of soil bacteria in addition to the minerals. At the end of nine weeks there were about twice as many plants in the second lot as in the first. Moreover, the plants that received the small amount of bacterial material averaged larger and were more healthy in appearance. The increase due to the bacterial cutlure was apparently out of all proportion to the actual substance added. Furthermore, increasing the amount of dead bacterial culture did not appreciably increase the remarkable benefits to the plants, in this way acting differently than an addition of more food material. The bacteria contributed something that behaved like a vitamin, enabling the plant to utilize to greater advantage food materials already available.

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[illegible] food materials already available.

ANCIENT HIPPO BONES FOUND IN LONDON

Beds of fossil bones of hippopotamus, mammoth, aurochs, giants deer and other Ice Age species were found recently in London at Charing Cross, in the course of excavating for the construction of a new building. A great portion of the land London stands on is the bed of a prehistoric Thames, which is rich in fossil remains. Stone age implements are occasionally turned up, as well as bones of animals bearing evidence of having been killed by hunters of early times.

ADDING MACHINES WILL SAVE ASTRONOMERS' TIME

At least two-thirds of the time now spent by astronomers on extended computations can be saved by the use of modern adding and computing machines, according to Dr. L. J. Comrie, of the Dearborn Observatory of Northwestern University. In the past, objections have been made to the use of such instruments from the possibility of their being inaccurate, but, said Dr. Comrie, "modern engineering skill has produced machines that are practically fool-proof, as well as versatile and easy to operate."

Dr. Comrie pointed out that this development of the computing machine to its present perfection is the result of its wide commercial application, but that this same development has caused the machines to be designed essentially for business purposes. Machines might be constructed which would suit the purposes of astronomers and other scientists much better than those nowin use, he said, if they were used to a sufficient extent.

BOTANISTS STRIVING TO SAVE RARE FERNS

The plight of an almost extinct species of fern, surviving from the geological days immediately succeeding the Ice Age, and now clinging precariously to life in a certain limited rocky area in a New York rural district, is interesting members of the Wild-Flower Preservation Society. Its extinction is threatened by the dynamite and steam shovels of a quarrying company, and interested naturalists are rescuing the plants as they have in the past rescued the bison and the antelope, and are transferring them to other places where they have a chance for life.

ARTIFICIAL BLIZZARD TESTS HARDINESS OF ORANGE TREES

An artificial cold wave, generated in an ice cream freezer and allowed to rage in a glass case, was a feature of experiments to determine hardiness of Florida fruit trees, conducted by Dr. James A. Harris of the University of Minnesota. Ice water from the freezer was pumped through a coil surrounding branches of the trees to be tested, the whole being surrounded by a double glass case. Thermometer readings showed at what temperatures the first signs of frostbite appeared, and when death from complete freezing occurred. Dr. Harris expects that tests of this nature will eventually be of value in selecting hardier strains of semi-tropical fruit trees for use in those parts of the South where occasional severe frosts may be expected.

PARASITE DIGEST ANT'S DIET OF WOOD

The ant who lives on wood doesn't have to digest it, according to studies conducted by L. R. Cleveland at Johns Hopkins University.

In the ant's abdomen is a great hive of primitive animals belonging to the order of protozoa. These take into themselves the wood particles swallowed by the insect and digest them.

Mr. Cleveland killed the protozoa by placing the ants in a temperature of 97 degrees Fahrenheit - seven degrees below the death point by heat of the ant. The ants themselves were not injured by this heating but nevertheless they died within two or three weeks, even when surrounded with plenty of wood. Heated ants that were fed humus, wood rotted or digested by fungi, thrived like normal ants. Their return to good wood digestion went hand in hand with the return of the parasite menagerie to the food tracts.

EARLY INVENTORS HAD THEIR TROUBLES

The trials and difficulties that inventors and discoverers underwent in earlier times, before the elaboration ofpatent and copyright laws, are interesting illustrated by a resolution recently dug up in the Transactions of the British Royal Soceity, dating back to 1667. This is believed to be one of the earliest attempts made to protect the rights of prior discovery. It is interesting to note that the safeguard proposed is not one of law, butof secrecy.

The extract follows: "Mention being made, that a security might be provided for such inventions or notions, as ingenious persons might have, or from which being excluded from having a share in them if they should be lighted on by others; it was though good, if any thing of that nature should be brought in, and desired to be lodged with the society, that, if the authors were not of their body they should be obliged to show it first to the president, and then it should be sealed up both by the small seal of the society, and by the seal of the proposer; but if they were of the society, then they should not be obliged to show it first to the president, but only to declare to him the general heads of the matter, and then it should be sealed up, as mentioned before."

FOREST RANGER INVENTS TRAFFIC MEASURING MACHINE

Disgust with routine work is a fertile mother of inventions. A part of the job of C. P. Mcfarland, forest ranger in the Cascade National Forest, was to keep track of the number of automobiles that traversedd the government roads. It was tiresome work, and mechanical. So Mr. Mcfarland invented a machine to do it. The traffic counter, as he calls his device, is a small platform resting upon springs, buried flush with the track in a narrow place in the road. It is connected by levers to a counting machine on a post. Each car depresses the platform about one-half inch, enough to work the counting machine but not enough to joltthe car.

IMPOSSIBLE TO JUDGE INTELLIGENCE FROM PICTURES

Individuals attempting to judge intelligence from photographs can obtain as accurate results with their eyes closed as with them open is the decision of Dr. Donald A. Laird and Herman Remmers of Colgate University.

Nearly 400 persons were asked to arrange ten or more pictures of persons of measured intelligence. Select the brainiest or most intelligent faces and arrange them in a descending order of intelligence, were the instructions. It was found that women were no better judges of intelligence than the men, but that both men and women had a tendency to rate women a little higher in the scale than men.

Groups of four or five were asked to work together with the same unreliable result. The tests were gone over again by a professional "character reader and vocational expert' and he did no better than the average person in arranging the pictures.

Other conclusions arrived at as a result of the tests were "Older persons have no better abilities in this than do the younger, and the more intelligent persons have no better abilities in this thanpersons with less intelligence."

"The average-person-at-large still possesses a large modicum of belief in his abilities in 'sizing up' others by appearances," the investigators comment. "The school superintendent demands a picture of the candidates for positions in the public schools, No picture, no job. A picture taken within certain date limits is one of the necessary qualifications for entering the consular service. And so the gauntlet runs from federal to individual in accepting their abilities is in estimating certain characteristics from personal appearance, more especially from photographs."

SEES AIRPLANE AS PLAGUE CARRIER

Spread of plagues into regions as yet free from them is a danger than threatens with the increased use of airplanes in long distance traffic, according to Air Commodore David Munro, of the British air service. In his presidential address to the Society of Medical Officers of Health, Commodore Munro pointed out that though there is at present no yellow fever in India, the species of mosquito instrumental in its spread is abundant, and that it would require only one fever patient to start an epidemic there. Similarly, an air-borne victim of sleeping sickness from Africa might start the disease in some other tropical region at present unvisisted with this scourge. At present, with the bulk of travel carried in steamers, quarantine rules are comparatively easy to enforce, but the development of air traffic wipes out sanitary frontiers as effectively as it does military ones.

CHESTNUT BLIGHT TAKES GIANT LEAP

The chestnut blight, which has till now been supposed to have reached only to central Virginia, has taken a tremendous stride and appeared in southwestern North Carolina, according to G. F. Gravatt of the Office of Forest Pathology, United States Department of Agriculture. On a recent reconnaissance trip in the south Mr. Gravatt discovered a considerable area in the famous Saluda district of the Blue Ridge Mountains which showed signs of severe blighting. He estimates that

the original infection dated back about ten years; the disease is now well underway in Henderson County.

Before this giant leap of the chestnut blight it had been though feasible to check the disease by cutting down all the chestnuts in a wide swathe around the main area of infection and so "firing back" in the way that prairie fires are stopped. The outbreak of the disease in the Saluda district removes all hope of this.

The big chestnut tan bark companies in North Carolina, where the finest stards of chestnut in this country are located, are undecided whether it will be best to lumber over all the available chestnut at once and so drug the market or to cut slowly and run the risk that the blight will get there before the sawmill. Blight-killed trees are useless for the tanning industry.

Chinese and Japanese chestnuts, with which the Department of Agriculture hopes to replace the native species, are reported to be very successful in all trials thus far. The Chinese chestnut promises to fulfill the three requirements of a perfect chestnut; it will develop blight-resistant strains, furnish a bark useful in tanning, and produce good nuts for eating.

TUBERCULOSIS DEATHS DECREASE 10 PER CENT. IN YEAR JUST ENDED

The year 1924 has won the honor of having had the lowest mortality rate ever recorded among the wage-earning populations of the United States and Canada. Statisticians of the Metropolitan Life Insurance Company have announced that based upon returns from fifteen million records a substantial decline in death rate as compared with 1923 is assured, although all reports are not yet in.

Heart disease, as in 1923 and 1922, will be the leading cause of death but the mortality, nevertheless, will be much lower than in 1923. Since 1911 there has been a decline of 20 points per 100,000 in the heart disease death rate.

The great health achievement of the year has been the marvelous reduction in the death rate from pulmonary tuberculosis. The rate this year will be slightly over 90 per 100,000 persons exposed. This marks a decline of 10 per cent. in one year. In 1911 the rate from this cause was more than twice the 1924 figure.

Pneumonia will be the third cause numerically. For the few diseases that show higher rates in 1924, either the increase has been small or the disease itself is of relatively minor importance numerically.

Present indications are that 1924 will be the first year since the automobile has become a means of transportation that the death rate from its casualties will not increase. Up to December 13 the 1924 rate was identical with that for the same time last year.

Sawdust briquets make excellent fuel for the kitchen range, being cheaper than coal, and having hardly any ash, no clinker, and very little smoke.

GIVES $350,000 TO START NEW SCIENTIFIC JOURNAL

The Rockefeller Foundation of New York has appropriated $350,000 to financ a new scientific periodical, it was announced by the National Research Council. The new journal will be known as "International Biological Abstracts", and is to give i condensed form a monthly summary of all publications in the fields of botany, zoolo bacteriology and kindred subjects. There are at present two similar but smaller journals covering parts of the field, "Botanical Abstracts", and "Bacteriolgical Abstracts". The new periodical will absorb and replace these, and in addition cover scientific territory at present not taken care of.

The expenditure of the $350,000 initial endowement will take care of edito ial and office expenses for ten years, so that subscriptions will need to support only the actual costs of printing and distribution. Publication will begin in January, 1926.

LEARNS HOW PUSSY LANDS RIGHT SIDE UP

How does a cat know how to land right side up when she is dropped? The answer is, according to Prof. R. Magnus of Utrecht, Holland, that she doesn't need to "know" at all, at least consciously.

In the course of experiments to determine the nature of the "sense of righ side-upness" possessed by all animals, Prof. Magnus put the forebrain of a cat, wher consciousness resides, out of commission by an operation, and then dropped the anima upside down. Every time he did it, pussy righted herself just as quickly and as eas as though she had full possession of her faculties. Prof. Magnus therefore conclude that keeping right side up is simply a mechanical or reflex action, quite beneath th dignity of attention from the higher brain centers.

TABLOID BOOK REVIEW

MARINE PRODUCTS OF COMMERCE: By Donald K. Tressler, Ph.D. 762 pages. New York: The Chemical Catalog Company, Inc. 1924.

Though intended to be sort of monographic commercial handbook, full of quantities and prices and with a tail of economic tables tacked on behind, Dr. Tres ler's work will bring to any imaginative person a whiff of romance with every chapt Read the list of a few chapter heads: Salt from Sea Water, Iodine and Potash from Seaweeds, Pearls and the Pearl Industry, The Precious Coral Industry, Marine Turtle and Terrapins, the Whaling Industry, Seals and Walruses, Sponges. And a half-dozen or moreof chapters about fishes and fisheries. It is a very useful book to the tid water business man, no question; but there will be times when he will catch himself wanting to run away and go to sea.

Railroads consume more steel than any other industry, buying 27.5 per cent of the total output.
